REMARKS

This Response to Final Office Action is being filed concurrently with a Request for Continued Examination. Applicants therefore respectfully request withdrawal of the finality of the subject office action, entry of the proposed amendments, and reconsideration and allowance of the subject application in view of the foregoing amendments and the following remarks. Claims 1, 4, 22, 23, 26, 33, 34, 37-39, 42, and 44-50 are pending in the application, with claims 1, 22, 26, 33, 34, and 37 being independent. Claims 1, 4, 22, 26, 33, 34, and 37 have been amended.

Rejections under 35 U.S.C. § 103(a)

In the Final Office Action mailed April 5, 2006, the Examiner rejected claims 1, 4, 22, 23, 26, 33, 34, 37-39, 42, and 44-49 under 35 U.S.C. §103(a) as being unpatentable over Kurowski (U.S. 6,553,127) in view of Cookson (U.S. Prov. App. 60/116,641), and rejected claim 38 and 39 over Kurowski in view of Cookson, and further in view of Bloom (U.S. 6,332,194).

Claims 1, 4, 44, and 50

As amended, claim 1 recites:

> 1. An audio watermarking system comprising:
> a pattern generator configured to generate both a strong watermark and a weak watermark; and
> a watermark insertion unit configured to selectively insert the strong watermark into at least one segment of an audio signal and to selectively insert the weak watermark into at least one other segment of the audio signal, so that at least some resulting segments have either the strong or the weak watermark inserted therein, but not both, and
> *wherein the watermark insertion unit further configures the segments of the audio signal to enable detection of the inserted strong and weak watermarks based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the segments contains no strong or weak watermark,*

and having a second expected value when the corresponding one of the segments contains either the strong or weak watermark. (emphasis added).

As noted by Applicants, a decision rule based on a "randomized correlation measure" provides a desired measure of additional security to the watermarking system. More specifically, such a slightly randomized decision rule for detecting the presence of a watermark "protects the system against attacks that modify the watermarked signal until the detector starts to fail" which could lead to a watermarking pattern being learned by unauthorized persons. (Application, p. 20, lines 1-5).

Applicants respectfully submit that Kurowski and Cookson (hereinafter the "Cited References"), either singly or in combination, fail to disclose, teach, or fairly suggest the audio watermarking system recited in claim 1. Specifically, neither Kurowski or Cookson teaches or suggests a system including a watermark insertion unit that *configures the segments of the audio signal to enable detection of the inserted strong and weak watermarks based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the segments contains no strong or weak watermark, and having a second expected value when the corresponding one of the segments contains either the strong or weak watermark* as recited in claim 1.

Cookson merely notes that a watermark may be detected. (p. 1, para. 1-3; p. 3, para. 1). Cookson is silent as to the particular details of performing the detection of the watermark. Cookson particularly fails to teach or suggest a watermark insertion unit that *configures the segments of the audio signal to enable detection of the inserted strong and weak watermarks based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the segments contains no strong or weak*

watermark, and having a second expected value when the corresponding one of the segments contains either the strong or weak watermark as recited in claim 1.

Similarly, Kurowski teaches analyzing blocks of a data stream, and based on a degree of variation in a selected characteristic of the block of the data stream, determining whether to watermark the block, or whether to attempt to detect a watermark within the block. (5:65-6:24; 7:14-15; 9:32-35). According to Kurowski, this detection scheme provides computational efficiency. (3:2-5). Kurowski is silent as to the particular details of performing the detection of the watermark. Kurowski particularly fails to teach or suggest a watermark insertion unit that *configures the segments of the audio signal to enable detection of the inserted strong and weak watermarks based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the segments contains no strong or weak watermark, and having a second expected value when the corresponding one of the segments contains either the strong or weak watermark* as recited in claim 1. Thus, claim 1 is allowable over the Cited References.

Claims 4, 44, and 50 depend from claim 1 and are allowable at least due to their dependencies on claim 1, and also due to additional limitations recited in those claims. For example, claim 4 recites the audio watermarking system as recited in claim 1, *wherein the randomized correlation measure has an approximately normal probability distribution and a variance substantially smaller than one.* (emphasis added). Similarly, claim 50 recites the audio watermarking system of claim 4, *wherein the first expected value of the randomized correlation measure is approximately zero, and the second expected value of the randomized correlation measure is approximately one.* (emphasis added). These additional limitations are also not disclosed, taught, or fairly suggested by the Cited References.

Claims 22, 23, and 45

Similarly, claim 22 (as amended) recites:

> 22. An audio watermarking architecture, comprising:
>
> a watermark encoding system configured to selectively insert a strong watermark into at least one segment of an audio signal and to selectively insert the weak watermark into at least one other segment of the audio signal, so that at least some resulting segments have either the strong or the weak watermark inserted therein, but not both; and
>
> a watermark detecting system configured to detect a presence of a watermark in the segments of the audio signal and, if a watermark is present, further configured to determine whether the present watermark is either the strong watermark or the weak watermark, and *wherein the watermark detecting system is configured to detect the presence of the watermark based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the segments contains no strong or weak watermark, and having a second expected value when the corresponding one of the segments contains either the strong or weak watermark, the first and second expected values being different.* (emphasis added).

Applicants respectfully submit that the Cited References fail to disclose, teach, or fairly suggest the audio watermarking architecture recited in claim 22. Specifically, the Cited References do not teach or suggest an architecture including a watermark detecting system *configured to detect the presence of the watermark based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the segments contains no strong or weak watermark, and having a second expected value when the corresponding one of the segments contains either the strong or weak watermark, the first and second expected values being different* as recited in claim 22.

As described more fully above, Cookson merely notes that a watermark may be detected, but is silent as to the details of how detection is accomplished. Similarly, Kurowski teaches analyzing blocks of a data stream, and determining whether to attempt to detect a watermark based on a degree of variation in a selected characteristic of the block. Kurowski fails to remedy, however, the above-noted deficiencies of Cookson. Thus, claim 22 is allowable over the Cited References. Claims 23 and 45 depend from claim 22 and are allowable at least due to their dependencies on claim 22, and also due to additional limitations recited in those claims.

Claims 26 and 46

Similarly, claim 26 (as amended) recites:

> 26. A method for watermarking an audio signal, comprising:
> watermarking a first portion of the audio signal with a strong watermark; and
> watermarking a second portion of the audio signal with a weak watermark, wherein the first and second portions are separate; and
> *detecting at least one of the strong and weak watermarks based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the first and second portions contains no watermark, the randomized correlation measure having a second expected value when the corresponding one of the first and second portions contains either the strong or the weak watermark.* (emphasis added).

Again, the Cited References do not teach or suggest a method for watermarking an audio signal including *detecting at least one of the strong and weak watermarks based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the first and second portions contains no watermark, the randomized correlation measure having a second expected value when the corresponding one of the first and second portions contains either the strong or the weak watermark* as recited in claim

26. Cookson merely notes that a watermark may be detected, but is silent as to the details of how detection is accomplished. Similarly, Kurowski merely teaches attempting to detect a watermark based on a degree of variation in a selected characteristic of the block. Thus, claim 26 is allowable over the Cited References. Claim 46 depends from claim 26 and is allowable at least due to its dependency on claim 26, and also due to additional limitations recited in this claim.

Claims 33 and 47-48

As amended, claim 33 recites:

> 33. A method comprising:
> selectively encoding portions of an audio signal with a strong watermark and selectively encoding other portions of the audio signal with a strong watermark, so that at least some resulting portions have either the strong or the weak watermark encoded therein, but not both; and
> *detecting a presence of a watermark in the portions of the audio signal based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the portions contains no watermark, the randomized correlation measure having a second expected value when the corresponding one of the portions contains either the strong or the weak watermark*; and
> if a watermark is present, determining whether the present watermark is either the strong watermark or the weak watermark. (emphasis added).

As described more fully above, the Cited References do not teach or suggest a method including *detecting a presence of a watermark in the portions of the audio signal based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the portions contains no watermark, the randomized correlation measure having a second expected value when the corresponding one of the portions*

contains either the strong or the weak watermark as recited in claim 33. Thus, claims 33 and 47-48 are allowable over the Cited References.

Claim 34

As amended, claim 34 recites:

> 34. A computer readable medium having computer executable instructions for:
> watermarking a first portion of an audio signal with a strong watermark; and
> watermarking a second portion of the audio signal with a weak watermark, wherein the first and second portions are separate; and
> *detecting at least one of the strong and weak watermarks based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the first and second portions contains no watermark, the randomized correlation measure having a second expected value when the corresponding one of the first and second portions contains either the strong or the weak watermark.* (emphasis added).

For the reasons set forth more fully above, the Cited References do not teach or suggest a computer readable medium having computer executable instructions for *detecting at least one of the strong and weak watermarks based on a randomized correlation measure, the randomized correlation measure having a first expected value when a corresponding one of the first and second portions contains no watermark, the randomized correlation measure having a second expected value when the corresponding one of the first and second portions contains either the strong or the weak watermark* as recited in claim 34. Thus, claim 34 is allowable over the Cited References.

Claims 37, 38-39, 42, and 49

As amended, claim 37 recites:

> 37. An audio watermarking system comprising:
> a pattern generator configured to generate both a strong watermark and a weak watermark; and
> a watermark insertion unit configured to insert the strong watermark into a first segment of the audio signal and to insert the weak watermark into a second segment of the audio signal, wherein the first and second segments are separate; and
> *a detector configured to detect the presence of the strong or weak watermark based on a randomized correlation measure, the randomized correlation measure having an expected value of approximately zero when a corresponding one of the first and second segments contains no watermark, and having the expected value of approximately one when the corresponding one of the first and second segments contains either the strong or the weak watermark.* (emphasis added).

Again, as described above, the Cited References do not teach or suggest a system that includes *a detector configured to detect the presence of the strong or weak watermark based on a randomized correlation measure, the randomized correlation measure having an expected value of approximately zero when a corresponding one of the first and second segments contains no watermark, and having the expected value of approximately one when the corresponding one of the first and second segments contains either the strong or the weak watermark* as recited in claim 37. Thus, claim 37 is allowable over the Cited References. Claims 38-39, 42, and 49 depend from claim 37 and are allowable at least due to their dependencies on claim 37, and also due to additional limitations recited in those claims.

Claims 38 and 39 have additionally been rejected over the teachings of Bloom (U.S. 6,332,194 B1) in combination with the Cited References. In relevant part, Bloom teaches various methods of watermark insertion, including insertion into compressed data (6:31-61), insertion into modified data (5:12-6:30), and other methods of watermark insertion. Bloom is silent as to the details of detecting the watermarks. More specifically, Bloom fails to teach or fairly suggest a system that includes *a detector configured to detect the presence of the strong or weak watermark based on a randomized correlation measure, the randomized correlation measure having an expected value of approximately zero when a corresponding one of the first and second segments contains no watermark, and having the expected value of approximately one when the corresponding one of the first and second segments contains either the strong or the weak watermark* as recited in claim 37. Since claims 38 and 39 depend from claim 37, these claims are allowable over Bloom in combination with the Cited References.

Double-Patenting Rejections

The Examiner also rejected claim 38 on the following grounds: (1) as claiming the same invention as claims 1 and 4 of U.S. Pat. No. 6,952,774 which issued from the parent application; (2) as claiming the same invention as claim 1 of co-pending U.S. App. No. 10/970,499; and (3) as being in conflict with claim 1 of co-pending U.S. App. No. 10/970,499.

Applicants respectfully submit that, by virtue of the amendment of claim 37, the Examiner's double-patenting rejections based on issued U.S. Pat. No. 6,952,774 and co-pending U.S. App. No. 10/970,499 are rendered moot. The subject limitations which have been added to claim 37 are not recited in any of the claims of issued U.S. Pat. No. 6,952,774 and co-pending U.S. App. No. 10/970,499. Applicants therefore respectfully request reconsideration and withdrawal of these rejections.

CONCLUSION

For the foregoing reasons, Applicants respectfully submit that claims 1, 4, 22, 23, 26, 33, 34, 37-39, 42, and 44-50 are in condition for allowance. If there are any remaining issues that may be handled by telephone conference, the Examiner is kindly invited to telephone the undersigned.

Respectfully Submitted,

Date: Oct. 5, 2006

By: Dale C. Barr

Dale C. Barr
Lee & Hayes, PLLC
Reg. No. 40,498
(206) 315-7916